

DRAFT

COUNTY OF SAN DIEGO

**INTERIM GUIDELINES FOR DETERMINING SIGNIFICANCE
AND
REPORT FORMAT AND CONTENT REQUIREMENTS
CLIMATE CHANGE**



LAND USE AND ENVIRONMENT GROUP

**Department of Planning and Land Use
Department of Public Works**

Circulated for Public Review
October 23, 2008 to November 21, 2008

APPROVAL

I hereby certify that these **Interim Guidelines for Determining Significance and Report Format and Content Requirements for Climate Change** are a part of the County of San Diego, Land Use and Environment Group's Guidelines for Determining Significance and Technical Report Format and Content Requirements and were considered by the Director of Planning and Land Use, in coordination with the Director of Public Works on the ___th day of _____, 2008.

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Director of Planning and Land Use

JOHN SNYDER
Director of Public Works

I hereby certify that these **Interim Guidelines for Determining Significance and Report Format and Content Requirements for Climate Change** are a part of the County of San Diego, Land Use and Environment Group's Guidelines for Determining Significance and Technical Report Format and Content Requirements and have hereby been approved by the Deputy Chief Administrative Officer (DCAO) of the Land Use and Environment Group on the ___th day of _____, 2008. The Director of Planning and Land Use is authorized to approve revisions to these Guidelines for Determining Significance and Report Format and Content Requirements for Climate Change, except any revisions to the Guidelines for Determining Significance presented in Chapter 4.0 must be approved by the Deputy CAO.

Approved, Month XX, 2008

CHANDRA WALLAR
Deputy CAO

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CLIMATE CHANGE



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EXPLANATION

These Interim Guidelines for Determining Significance for Climate Change and the information presented herein shall be used by County staff for the review of discretionary projects and environmental documents pursuant to the California Environmental Quality Act (CEQA). These Guidelines present a range of quantitative, qualitative, and performance levels for particular environmental effects. Normally, (in the absence of substantial evidence to the contrary), an affirmative response to any one Guideline will mean the project will result in a significant effect, whereas effects that do not meet any of the Guidelines will normally be determined to be “less than significant.” Section 15064(b) of the State CEQA Guidelines states:

“The determination whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on factual and scientific data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting.”

The purpose of these Guidelines is to provide for a consistent and objective evaluation of significant effects. These Guidelines are not binding on any decision-maker and do not substitute for the use of independent judgment to determine significance or the evaluation of evidence in the record. The County reserves the right to modify these Guidelines in the event of scientific discovery or alterations in factual data that may alter the common application of a Guideline.

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List of Acronyms

APCD	Air Pollution Control District
AB 32	Assembly Bill 32 Global Warming Solutions Act of 2006
AG	Attorney General
ARB	Air Resources Board
ASTM	American Society of Testing and Material
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CAT	Climate Action Team
CCAP	Center for Clean Air Policy
CCAR	California Climate Action Registry
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CF	Connectivity Factor
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CNG	Compressed Natural Gas
CPUC	California Public Utilities Commission
CUFR	California Urban Forestry
DGS	Department of General Services
DOE	U.S. Department of Energy
DOF	Department of Finance
DPF	Diesel Particulate Filter
DWR	Department of Water Resources
E85	85% Ethanol
EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EERE	Energy Efficiency and Renewable Energy
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
EV	Electric Vehicles
FAR	Floor Area Ratio
GHG	Greenhouse Gas
GGEP	Greenhouse Gas Emissions Policy
GGRP	Greenhouse Gas Reduction Plan
GP	General Plan
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IT	Information Technology
ITE	Institute of Transportation Engineers
LEED	Leadership in Energy and Environmental Design
LNG	Liquefied Natural Gas
MMT	Million Metric Tons
MW	Megawatts

N ₂ O	Nitrous Oxide
NO _x	Oxides of Nitrogen
NREL	National Renewable Energy Laboratory
OPR	State Office of Planning and Research
PFC	Perfluorocarbon
PM	Particulate Mater
ROG	Reactive Organic Gas
RPS	Renewable Portfolio Standards
RTP	Regional Transportation Plan
S-3-05	Executive Order S-3-05
SB	Senate Bill
SDCGHGI	San Diego County Greenhouse Gas Inventory
SO _x	Sulfur Oxides
SP	Service Population
SRI	Solar Reflectance Index
SWP	State Water Project
TAC	Toxic Air Contaminants
THC	Total Hydrocarbon
ULEV	Ultra Low Emission Vehicle
UNFCCC	United Nations Framework Convention on Climate Change
URBEMIS	Urban Emissions Model
USGBC	U.S. Green Building Council
VMT	Vehicle Miles Traveled

INTRODUCTION

This document provides guidance for evaluating the adverse environmental effects that a proposed land development project may have on global climate change (GCC) due to its emissions of greenhouse gases (GHGs). Most scientists believe that GCC is caused by GHGs, or gases that trap heat in the atmosphere. New development typically results in increased emissions of GHGs due to additional vehicular use, energy use, and other resource use. To help reduce GHG emissions in California, the California Global Warming Solutions Act of 2006 (AB 32) mandates significant reductions in GHGs. Senate Bill 97, enacted in 2007, amends the CEQA statute and clearly establishes that GHG emissions and the effects of GCC are appropriate subjects for CEQA analysis. It directs the State Office of Planning and Research (OPR) to develop draft CEQA Guidelines “for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions” by July 1, 2009 and directs the Resources Agency to certify and adopt the revised CEQA Guidelines by January 1, 2010. As additional guidance from the State is provided, these Guidelines will be updates as needed.

Although most projects have some potential to generate GHGs, these guidelines present screening criteria to identify the types of projects that will be required to prepare a Climate Change Analysis. Projects that would generate 900 metric tons or more of GHGs will be required to prepare a Climate Change Analysis and demonstrate that the project would not conflict with the goals and strategies established in AB 32 to reduce GHG emissions to 1990 levels by the year 2020. This screening criterion is based on the California Air Pollution Control Officers Association (CAPCOA) white paper which considered various methods of evaluating and addressing greenhouse gas emissions under CEQA to assist local governments in creating significance thresholds. According to the CAPCOA white paper, 900 metric tons of GHG emissions are generally produced by a 50 unit subdivision, a 35,000 square foot commercial or office center, or 11,000 square feet of retail.

In addition to analyzing project level GHG emissions, CEQA also requires that decision makers consider the potential impacts of Climate Change on a project. For example, a project located in a low lying coastal area may be inundated if the ocean levels continue to rise. However, due to the project specific nature of the potential effects of climate change on proposed projects, this document does not create a guideline for determining significance for the potential impact of Climate Change on a project. The Climate Change Report Format and Content Requirements require that the climate change analysis include a discussion of the potential impacts of Climate Change on the project.

1.0 GENERAL PRINCIPLES AND EXISTING CONDITIONS

GHGs have been at the center of a widely contested political, economic, and scientific debate surrounding GCC. Although the conceptual existence of GCC is generally accepted, the extent to which GHGs contribute to it remains a source of debate. The State of California has been at the forefront of developing solutions to address GCC. GCC refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and/or human activities that change the composition of the atmosphere and alter the surface and features of the land. The accumulation of GHG emissions in the atmosphere has been associated with global warming, or an average increase in the temperature of the atmosphere near the Earth's surface. GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon), in conjunction with other human activities, appears to be closely associated with global warming.

State law defines GHG as being any of the following compounds: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) (Health and Safety Code, section 38505(g).) Carbon dioxide, followed by methane and nitrous oxide, are the most common GHGs that result from human activity.

1.1 Sources and Global Warming Potentials of GHG

The State of California GHG Inventory performed by the California Air Resources Board (CARB), compiled statewide anthropogenic GHG emissions and sinks. It includes estimates for CO₂, CH₄, N₂O, SF₆, HFCs, and PFCs. The current inventory covers the years 1990 to 2004 (Table 1 and 2). Data sources used to calculate this GHG inventory include California and federal agencies, international organizations, and industry associations. The calculation methodologies are consistent with guidance from the Intergovernmental Panel on Climate Change (IPCC). The 1990 emissions level is the sum total of emissions and removals from all sectors and categories in the inventory. The inventory is divided into seven broad sectors of economic activity within California. These sectors include: Agriculture; Commercial; Electricity Generation; Forestry; Industrial; Residential; and, Transportation.

Table 1 – State of California GHG Emissions by Sectors in 1990* (433 MMTCO₂e Gross Emissions)

Sector	Total Emissions (MMTCO₂e)	Percent of Total Emissions
Agriculture	23.4	5%
Commercial	14.4	3%
Electricity Generation	110.6	26%
Forestry (excluding sinks)	0.2	<1%
Industrial	103.0	24%
Residential	29.7	7%
Transportation	150.7	35%
Forestry Sinks	-6.7	--

* The remaining 1.3 MMTCO₂e are from unspecified fuel combustion which could not be attributed to an individual sector. Percents may not total 100 due to rounding.

Table 2 – State of California GHG Emissions by Sectors in 2004* (484 MMTCO₂e Gross Emissions)

Sector	Total Emissions (MMTCO₂e)	Percent of Total Emissions
Agriculture	27.9	6%
Commercial	12.8	3%
Electricity Generation	119.8	25%
Forestry (excluding sinks)	0.2	<1%
Industrial	96.2	20
Residential	29.1	6%
Transportation	182.4	38%
Forestry Sinks	-4.7	--

* The remaining 16.0 MMTCO₂e are from unspecified fuel combustion which could not be attributed to an individual sector. Percents may not total 100 due to rounding.

When accounting for GHGs, all types of GHGs emissions are expressed in CO₂ equivalents (CO₂e) and are typically quantified in metric tons (MT) or millions of metric tons (MMT). Each GHG has variable Global Warming Potential (GWP) and atmospheric lifetime. GWP is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming over a specific time interval. The time interval is defined by the atmospheric lifetime of the GHG, or the average time the

molecule stays stable in the atmosphere. The GWP is based on the atmospheric lifetime and the CO₂e which compares the gas in question to that of the same mass of carbon dioxide, which as a GWP of 1. The GWP and atmospheric lifetimes of common GHGs is provided in Table 3.

Table 3 - Global Warming Potentials and Atmospheric Lifetimes of Basic GHGs

GHG	Formula	100-year global warming potential*	Atmospheric lifetime (yrs)
Carbon dioxide	CO ₂	1	Variable
Methane	CH ₄	21	12 ± 3
Nitrous oxide	N ₂ O	310	120
Sulphur hexafluoride	SF ₆	23,900	3 200

* The warming effects over a 100-year time frame relative to other greenhouse gases. (USEPA 2006)

In addition to the State of California GHG Inventory, a more specific regional GHG inventory was prepared by the University of San Diego School of Law Energy Policy Initiative Center². This San Diego County Greenhouse Gas Inventory (SDCGHGI) is a detailed inventory that takes into account the unique characteristics of the region in calculating emissions. The GHG inventory calculated GHG emissions for 1990, 2006 and projected out for 2020. Based on this inventory and the emissions projections for the region, the study found that emissions of GHGs must be reduced by 33 percent below business as usual in order for San Diego County to achieve 1990 emissions levels by the year 2020. Businesses as usual, or forecasted emissions, are defined as the emissions that would have occurred in the absence of AB 32's mandated reductions. Construction of buildings using only Title 24 building standards (or simply relying on the 2006 version of the County Building Code) would create GHG emissions as forecasted.

Areas where feasible reductions can occur and the strategies for achieving these reductions are outlined in the SDCGHGI study and are used as the basis for determining whether a project would conflict with the goals of AB 32 in accordance with the interim guideline for determining significance established in this document. A summary of the various sectors that contribute to GHGs in San Diego County, total emissions, and the percent contribution for each sector is provided in Table 4.

² The document is titled, "San Diego County Greenhouse Gas Inventory: An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets" and is available online at <http://www.sandiego.edu/epic/ghginventory/>.

Table 4 – San Diego County GHG Emissions by Category (2006)*

Sector	Total Emissions (MMTCO₂e)	Percent of Total Emissions
On-Road Transportation	16	46%
Electricity	9	25%
Natural Gas Consumption	3	9%
Civil Aviation	1.7	5%
Industrial Processes & Products	1.6	5%
Other Fuels / Other	1.1	4%
Off-Road Equipment & Vehicles	1.3	4%
Waste	0.7	2%
Agriculture/Forestry/Land Use	0.7	2%
Rail	0.3	1%
Water-Borne Navigation	127,000 metric tons	0.4%

* Energy Policy Initiative Center, University of San Diego School of Law

The sources of GHG emissions, GWP, and atmospheric lifetime of GHGs are all important variables to be considered in the process of calculating CO₂e for discretionary land use projects that require a climate change analysis.

2.0 EXISTING REGULATIONS AND POLICIES

All levels of government have some responsibility for the protection of air quality, and each level (Federal, State, and regional/local) has specific responsibilities relating to air quality regulation. GHG emissions and the regulation of GHGs is a relatively new component of air quality.

2.1 National and International Efforts

International and Federal legislation have been enacted to deal with climate change issues. In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis for human-induced climate change, its potential impacts, and options for adaptation and mitigation. The most recent reports of the IPCC have emphasized the scientific consensus that real and measurable changes to the climate are occurring, that they are caused by human activity, and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.

In October 1993, President Clinton announced his Climate Change Action Plan, which had a goal of returning GHG emissions to 1990 levels by the year 2000. This was to be accomplished through 50 initiatives that relied on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in GHG emissions. On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments agreed to gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change. Recently, the United States Supreme Court declared in the court case of *Massachusetts et al. v. Environmental Protection Agency et al.*, 549 C.S. 497 (2007) that the EPA does have the ability to regulate GHG emissions. In addition to the national and international efforts described above, many local jurisdictions have adopted climate change policies and programs.

2.2 State Regulations and Standards

Assembly Bill 32, the California Climate Solutions Act of 2006³

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006, into law. In general, AB 32 directs the CARB to do the following:

- Make publicly available a list of discrete early action GHG emission reduction measures that can be implemented prior to the adoption of the statewide GHG limit and the measures required to achieve compliance with the statewide limit;
- Make publicly available a GHG inventory for the year 1990 and determine target levels for 2020;
- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures;
- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020, to become operative on January 1, 2012, at the latest. The emission reduction measures may include direct emission reduction measures, alternative compliance mechanisms, and potential monetary and non-monetary incentives that reduce GHG emissions from any sources or categories of sources that CARB finds necessary to achieve the statewide GHG emissions limit; and
- Monitor compliance with and enforce any emission reduction measure adopted pursuant to AB 32.

Regarding the first two bullets, CARB has already made available a list of discrete early action GHG emission reduction measures. CARB has also published a staff report titled

³ Health and Safety Code Section 38500 *et seq.*

California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit that determined the statewide levels of GHG emissions in 1990. CARB identified 427 million metric tons of CO₂ as the total statewide aggregated greenhouse gas 1990 emissions level and 2020 emissions limit.

Senate Bill 97

Senate Bill 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directs OPR to develop draft CEQA Guidelines “for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions” by July 1, 2009 and directs the Resources Agency to certify and adopt the CEQA Guidelines by January 1, 2010.

Executive Order #S-3-05

Executive Order #S-3-05, signed by Governor Schwarzenegger on June 1, 2005, calls for a reduction in GHG emissions to 1990 levels by 2020 and for an 80 percent reduction in GHG emissions by 2050. Executive Order #S-3-05 also calls for the California EPA (CalEPA) to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy. The first of these reports, “Our Changing Climate: Assessing Risks to California”, and its supporting document, “Scenarios of Climate Change in California: An Overview” (herein referred to as the Climate Scenarios report), was published by the California Climate Change Center in 2006.

State Standards Addressing Vehicular Emissions

Regulations aimed at on-road transportation emissions will be the primary source of emission reductions of GHGs by the year 2020. To this end, AB 1493, or the Pavley Bill, set the standard for new light-duty passenger vehicles. Once implemented, emissions from these vehicles are expected to be reduced in San Diego County by 21 percent by 2020. The federal Corporate Average Fuel Economy (CAFE) standard determines the fuel efficiency of certain vehicle classes in the United States. The current standard has remained largely unchanged since 1990. In 2007, as part of the Energy and Security Act of 2007, CAFE standards were increased for new light-duty vehicles to 35 miles per gallon by 2020. These increases in fuel efficiency translate into reductions of GHG emissions. In addition, the Low Carbon Fuel Standard (LCFS) was included in a California Governor’s Executive Order that was promulgated in January 2007. This strategy addresses the type of fuel used in vehicles. Efficiency standards affect the total amount of fuel used, whereas the low-carbon fuel standard seeks to reduce the carbon content of the fuel, therefore reducing GHG emissions even if total fuel consumption is not reduced. The Low-Carbon Fuel Standard has been approved by CARB as a discrete early action item under AB 32 and implementing regulations are currently under development. It is assumed that the effects of the Low-Carbon Fuel Standard would be a 10% reduction in GHG emissions from fuel use by 2020.

2.3 Local Regulations and Standards

The County is working to develop a comprehensive strategy that will enhance the sustainability of County business operations and communities, building on the many energy efficient and environmentally sound practices already in place in County departments. Additionally, the County is working on a General Plan Update. The update is based on smart growth and land planning principles that will reduce Vehicle Miles Traveled (VMT), and thus result in a reduction of GHGs. This will be accomplished by locating future development within and near existing infrastructure. The General Plan Update will result in an implementation plan, with respect to the reduction of GHGs, which will include the following actions:

- Prepare a climate change action plan with a baseline inventory and emissions reduction targets for greenhouse gas emissions from all sources;
- Develop regulations and procedures to encourage the design and construction of new buildings in accordance with “green building” programs; and
- Develop regulations that encourage the use of energy recovery, as well as photovoltaic and wind energy in appropriate areas;

Currently, the County has a number of aggressive outreach and small business assistance programs that promote ways to reduce air and water pollution. This includes a Green Building Program which is designed to educate builders and provide incentives for the incorporation of green building standards (<http://www.sdcountry.ca.gov/dplu/greenbuildings.html>). Additionally, there are outreach programs that focus on the importance of reducing air quality impacts (lawn mower trade-in program) and reducing solid waste by recycling (compost bin give always and transfer station events).

The County is also making its own effort to reduce its carbon footprint. The County has various internal policies in place to reduce GHG emissions from County operations. The County Board of Supervisor’s Policy B-67 requires that preference be given to products which conform to the Minimum Recycled Content Standards. This includes purchases and is used by the County of San Diego, its contractors, and its grantees in its procurement practices. Similarly, the County has established design standards (Board Policy G-15) for County facilities that set forth appropriate techniques, materials, and technology to improve public accessibility, energy performance, resource utilization, and the work environment. In the recent past, several county facilities have either been built to LEED standards or have incorporated renewable energy resources such as photovoltaics.

3.0. TYPICAL ADVERSE EFFECTS AND CLIMATE CHANGE ANALYSIS SCREENING CRITERIA

3.1 Typical Adverse Effects

The Climate Scenarios report, published in 2006 by the California Climate Change Center, uses a range of emissions scenarios developed by the IPCC to project a series of potential warming ranges (i.e., temperature increases) that may occur in California during the 21st century. Three warming ranges are identified: lower warming range [3.0 to 5.5 degrees Fahrenheit (°F)]; medium warming range (5.5 to 8.0°F); and higher warming range (8.0 to 10.5°F). The Climate Scenarios report then presents an analysis of the future projected climate changes in California under each warming range scenario.

According to the report, substantial temperature increases would result in a variety of impacts to the people, economy, and environment of California. These impacts would result from a projected increase in extreme conditions, with the severity of the impacts depending upon actual future emissions of GHGs and associated warming. These impacts are described below.

Public Health

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to O₃ formation are projected to increase by 25 to 35 percent under the lower warming range and 75 to 85 percent under the medium warming range. In addition, if global background O₃ levels increase as is predicted in some scenarios, it may become impossible to meet local air quality standards. An increase in wildfires could also occur, and the corresponding increase in the release of PM_{2.5} (which can travel long distances depending on wind conditions) could further compromise air quality. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming scenario, Los Angeles and Sacramento, by the year 2100, could experience as many as 100 more days per year with temperatures above 90°F and 95°F respectively. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures will increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Water Resources

A vast network of reservoirs and aqueducts capture and transport water throughout the State from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada mountain snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If GHG emissions continue unabated, more precipitation may fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. Under the lower warming scenario, snowpack losses are expected to be only half as large as those expected if temperatures were to rise to the higher warming range. How much snowpack will be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack would pose challenges to water managers, hamper hydropower generation, and could eliminate all skiing and other snow-related recreational activities.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater would degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality of water within the southern edge of the Sacramento/San Joaquin River Delta. The Delta accounts for a portion of San Diego County's water supply and is a major source of water for the State as a whole.

Agriculture

Increased GHG emissions are expected to cause widespread changes to the agriculture industry, reducing the quantity and quality of agricultural products statewide. Significant reductions in available water supply to support agriculture will impact production. Although higher CO₂ levels can stimulate plant production and increase plant water-use efficiency, California's farmers will face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development will change, as will the intensity and frequency of pest and disease outbreaks. Rising temperatures will likely aggravate O₃ pollution, which will in turn make plants more susceptible to disease and pests and interfere with plant growth.

Plant growth tends to be slow at low temperatures and increase up to a certain point with rising temperatures. Faster growth, however, can result in less-than-optimal development for many crops, thus decreasing the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts, and milk.

Ecosystems/Habitats

Continued global warming will likely shift the ranges of existing invasive plants and weeds, thus altering competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Should range contractions occur, it is likely that new weed species will fill the emerging gaps. Continued global warming is also likely to increase the populations of many pests, lead to the emergence of new types of pests, and increase pathogen growth rates amongst these pests. The effects of these changes on ecosystems are largely unknown. The potential exists, however, for these changes to have significant impacts on the health of the various ecosystems located in the County and the State.

Moreover, continued global warming will alter natural ecosystems and biological diversity within the State. For example, alpine and sub-alpine ecosystems are expected to decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the State's forests is also expected to decrease as a result of global warming.

Wildland Fires

Global warming is expected to increase the risk of wildfire and alter the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the State. For example, an increase in precipitation (a potential result of a rise in temperatures) could lead to a 30 percent increase in southern California wildfires by the end of the century. In contrast, precipitation decreases could increase wildfires in northern California by as much as 90 percent.

Rising Sea Levels

Rising sea levels, more intense coastal storms, and warmer water temperatures will increasingly threaten the State's coastal regions. Under the higher warming scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

3.2 Climate Change Analysis Screening Criteria

Discretionary (non-industrial) projects that are greater than or equal to the project sizes listed in Table 5 must perform a climate change analysis. The project sizes shown below represent the project sizes that are estimated to emit approximately 900 metric tons of GHGs. These emissions levels are based on the amount of vehicle trips each project type would generate, the typical energy and water use associated with these projects, and other factors. The need for a climate change analysis for project types not listed in Table 5 will be evaluated on a case-by-case basis, using the 900 metric ton figure as a general gauge for determining which projects will require an analysis.

The 900 metric ton screening threshold for determining when an air quality analysis is required was chosen based on available guidance from the CAPCOA white paper (<http://www.capcoa.org/>) on addressing greenhouse gas emissions under CEQA. The CAPCOA white paper references a 900 metric ton guideline as a conservative threshold for requiring further analysis and mitigation.

This approach ensures that new development with the potential to make cumulatively considerable contributions to climate change, will incorporate appropriate mitigation measures and not result in a conflict with the goals of AB 32.

Table 5 – Project Type Examples* that Require Climate Change Analysis and Mitigation Measures

Project Type	Project Size that Generates Approximately 900 metric Tons of GHGs per Year
Single Family Residential	50 units
Apartments / Condominiums	70 units
General Commercial Office Space	35,000 square feet
Retail Space	11,000 square feet
Supermarket / Grocery Space	6,300 square feet

* A determination on the need for a climate change analysis for project types that do not fit the categories in this table (mixed use/industrial) will be made on a case-by-case basis, based on whether a project could generate 900 metric tons or more of GHGs.

4.0 GUIDELINE FOR DETERMINING SIGNIFICANCE

The guideline for determining significance discussed below has been developed from AB 32. This guideline addresses the potential cumulative impacts that a project's GHG emissions could have on Climate Change. Since Climate Change is a global phenomenon, no direct impact would be identified for an individual land development project. For projects that exceed the screening criteria detailed in Section 3.2, an affirmative response to the following Guideline will generally be considered a significant impact to climate change as a result of project implementation, in the absence of scientific evidence to the contrary:

- ***The project will conflict with the goals and strategies of AB 32 to reduce GHGs to 1990 levels by 2020.***

Projects that meet the criteria for conducting a climate change analysis will be required to perform a GHG inventory to determine GHG emissions associated with project implementation and operation under business as usual conditions. As stated earlier, business as usual is defined as the emissions that would have occurred in the absence of the mandated reductions. Based on the significance guideline, applicable projects will have to demonstrate how project design measures and/or mitigation measures will reduce GHG emissions to enable the region to reduce GHG emissions to 1990 levels by the year 2020. The SDCGHGI has prepared the most comprehensive assessment of the regions GHG emissions and has outlined an approach that will allow the region to achieve the 1990 levels by the year 2020.

According to the SDCGHGI, the region must reduce its GHG emissions by 33 percent from business as usual to achieve 1990 emissions levels by the year 2020. In order for projects to demonstrate that they do not conflict with the goals and policies of AB 32, those that exceed the screening criteria will need to prepare a climate change inventory

and demonstrate that the construction, operational, and vehicular emissions associated with the project will be reduced by 33 percent from business as usual emissions levels. According to the SDCGHGI, a majority of the region's emissions are attributable to on-road transportation. Similarly, a majority of emissions resulting from land development projects will often be attributable to on-road transportation emissions. According to the SDCHGHI study, the emissions reductions for on-road transportation will be achieved in a variety of ways, including through regulations aimed at increasing fuel efficiency standards and decreasing vehicle emissions.

5.0 STANDARD MITIGATION AND PROJECT DESIGN CONSIDERATIONS

In order to meet emissions reduction targets, the region will need to reduce VMT by 10 percent. Therefore, individual development projects will be required to demonstrate that project emissions associated with VMT will meet the 10 percent reduction while operational and construction emissions would need to be reduced by 33 percent below business as usual. Table 6 provides a summary of these general emissions reductions requirements for individual projects.

Table 6 – Required Emissions Reductions for Projects that Require Preparation of a Climate Change Analysis

	<i>Construction and Operational Emissions</i>	<i>On-road vehicular emissions</i>
Required Emissions Reductions	33 Percent of total Construction and Operational Emissions	10 Percent of total VMT

The Climate Change Report Format and Content Requirements further detail the methodologies, modeling and other requirements for a climate change analysis.

The following project design or mitigation measures are examples that may be applied to a project to reduce GHG emissions to at least 33% below BAU. Project mitigation or design measures will vary depending on the type project, the type of GHG emissions, and various other factors that would be detailed in the climate change analysis. It is not intended that each mitigation measure identified in this section be applied to every project or that the mitigation be written exactly as presented herein. Similarly, a project may require mitigation that is not specifically identified in this document. Table 16 in Appendix B of the CAPCOA white paper is devoted to mitigation measures⁴ and is an excellent resource for additional mitigation measures. A non-exclusive list of mitigation measures are described below.

⁴ See <http://www.capcoa.org/ceqa/CAPCOA%20White%20Paper%20-%20CEQA%20and%20Climate%20Change.pdf> for the CAPCOA White Paper and refer to Appendix B, Mitigation Measure Summary.

5.1 Generally Applicable Measures

Energy Efficiency

- Design buildings to be energy efficient. Site buildings to take advantage of shade, prevailing winds, landscaping and sun screens to reduce energy use.
- Install efficient lighting and lighting control systems. Use daylight as an integral part of lighting systems in buildings.
- Install light colored “cool” roofs, cool pavements, and strategically placed shade trees.
- Provide information on energy management services for large energy users.
- Install energy efficient heating and cooling systems, appliances and equipment, and control systems.
- Install light emitting diodes (LEDs) for traffic, street and other outdoor lighting.
- Limit the hours of operation of outdoor lighting.
- Use solar heating, automatic covers, and efficient pumps and motors for pools and spas.
- Provide education on energy efficiency.

Renewable Energy

- Install solar and wind power systems, solar and tankless hot water heaters, and energy-efficient heating ventilation and air conditioning. Educate consumers about existing incentives.
- Install solar panels on carports and over parking areas.
- Use combined heat and power in appropriate applications.

Water Conservation and Efficiency

- Create water-efficient landscapes.
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
- Use reclaimed water for landscape irrigation in new developments and on public property. Install the infrastructure to deliver and use reclaimed water.
- Design buildings to be water-efficient. Install water-efficient fixtures and appliances.
- Use greywater. (Greywater is untreated household waste water from bathtubs, showers, bathroom wash basins, and water from clothes washing machines.) For example, install dual plumbing in all new development allowing greywater to be used for landscape irrigation.
- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.
- Restrict the use of water for cleaning outdoor surfaces and vehicles.
- Implement low-impact development practices that maintain the existing hydrologic character of the site to manage storm water and protect the

environment. (Retaining storm water runoff on- site can drastically reduce the need for energy-intensive imported water at the site.)

- Devise a comprehensive water conservation strategy appropriate for the project and location. The strategy may include many of the specific items listed above, plus other innovative measures that are appropriate to the specific project.
- Provide education about water conservation and available programs and incentives.

Solid Waste Measures

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).
- Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.

Land Use Measures

- Include mixed-use, infill, and higher density in development projects to support the reduction of vehicle trips, promote alternatives to individual vehicle travel, and promote efficient delivery of services and goods.
- Incorporate public transit into project design.
- Preserve and create open space and parks. Preserve existing trees, and plant replacement trees at a set ratio.
- Include pedestrian and bicycle-only streets and plazas within developments. Create travel routes that ensure that destinations may be reached conveniently by public transportation, bicycling or walking.

Transportation and Motor Vehicles

- Use low or zero-emission vehicles, including construction vehicles.
- Promote ride sharing programs e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles, and providing a web site or message board for coordinating rides.
- Create car sharing programs. Accommodations for such programs include providing parking spaces for the car share vehicles at convenient locations accessible by public transportation.
- Create local “light vehicle” networks, such as neighborhood electric vehicle (NEV) systems.
- Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations)
- Build or fund a transportation center where various public transportation modes intersect.
- Provide shuttle service to public transit.
- Provide public transit incentives such as free or low-cost monthly transit passes.
- Promote “least polluting” ways to connect people and goods to their destinations.

- Incorporate bicycle lanes and routes into street systems, new subdivisions, and large developments.
- Incorporate bicycle-friendly intersections into street design.
- For commercial projects, provide adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience. For large employers, provide facilities that encourage bicycle commuting, including, e.g., locked bicycle storage or covered or indoor bicycle parking.
- Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.
- Work with the school district to restore or expand school bus services.

6.0 REFERENCES

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